

Applicant : Brian J. McNamara et al.  
 Serial No. : 10/722,845  
 Filed : November 25, 2003  
 Page : 5 of 13

Attorney's Docket No.: 12754-068002 / IO402USCON

## REMARKS

### I. Introduction

For reasons set forth below, Applicant respectfully submits that all pending claims are patentable over the cited prior art references.

### II. The Rejection Of Claims 13, 15, 17, 20-24 and 26-27 Under 35 U.S.C. § 103

Claims 13, 15, 17, 20-24 and 26-27 are rejected under 35 U.S.C. § 103(a) as being unpatentable over JP No. 411205043A to Irie in view of USP No. 5,973,539 to Komurasaki, and further in view of USP No. 5,280,648 to Dobrovolny. Applicant respectfully requests reconsideration of this rejection for at least the following reasons.

#### Claim 13

Claim 13 recites in-part a dual band mixer including a first transistor to mix a first local oscillator input signal with a first radio frequency input signal, and a second transistor to mix a second local oscillator input signal with a second radio frequency input signal.

In the statement of rejection, the Examiner admits that Irie does not disclose a first transistor to mix a first local oscillator input signal with a first radio frequency input signal, and a second transistor to mix a second local oscillator input signal with a second radio frequency input signal (page 3, 2<sup>nd</sup> ¶ of Office Action), and Komurasaki is relied upon to cure these deficiencies. The Examiner asserts that the proposed modification of Irie using the teachings of Komurasaki "would have been obvious ... so that the power supply voltage [of the system disclosed in Irie] can be reduced (page 3, 4<sup>th</sup> ¶ of Office Action). Applicant respectfully disagrees for reasons set forth below.

#### A. Komurasaki Does Not Teach A Second Transistor To Mix A Second Local Oscillator Input Signal

Komurasaki describes a mixer circuit that yields a reduction of power supply voltage (3:15-17). The mixer circuit includes NPN bipolar transistors 1-4, constant current sources 5/6, a

phase shifter 7, a first input terminal 11, a second input terminal 12a, a third input terminal 12b, and a pair of output terminals 13a/13b (4:19-23). Transistors 1/2 have bases thereof respectively connected to input terminals 12a/12b, and the emitters connected commonly to each other and to the line of ground potential GND through a node N5 (4:29-35). Similarly, transistors 3/4 have their bases connected to input terminals 12a/12b, and emitters connected commonly to reach other and to the line of the ground potential GND through a node N6 (4:36-41). Phase shifter 7 is connected between nodes N5 and N6, and changes phases of the signal  $v_1$  input to node N5 by  $180^\circ$ , and outputs the inverted signal  $v_1$  to the output terminal 13b (4:42-44).

However, Komurasaki fails to disclose a second transistor to mix a second local oscillator input signal with a second radio frequency input signal, as required by claim 1. In Komurasaki, a single differential signal is input into the mixer circuit to generate sinusoidal waves of mutually different frequencies. However, Komurasaki does not provide any disclosure that supports that a second local oscillator input signal is mixed with a second radio frequency input signal by a second transistor.

#### **B. Irie and Komurasaki Do Not Provide The Requisite Motivation**

Applicant respectfully submits that the pending rejection has inadvertently overlooked the fact that the approach taught by Komurasaki is only applicable to differential signals, and Irie does not utilize differential signals. As is evident from Irie that no such differential transistors are employed, it is inevitable that the alleged motivation is improper.

Additionally, Applicant submits that the alleged motivation is not credible. Irie expressly discloses turning off electrical components that are not in use (e.g., multipliers 2/4) so that power consumption can be reduced and battery operation time can be extended (see, ¶ 0041).

Applicant respectfully submits that modifying the mixer circuit of Irie by adding the alleged transistors as disclosed in Komurasaki would actually increase the overall power consumption of the mixer circuit of Irie, as new electrical connections, additional components (e.g., transistors and current sources), and signals would be unnecessarily introduced to ensure the operations of the additional differential signals and transistors.

Applicant : Brian J. McNamara et al.  
 Serial No. : 10/722,845  
 Filed : November 25, 2003  
 Page : 7 of 13

Attorney's Docket No.: 12754-068002 / I0402USCON

**C. Dobrovolny Does Not Teach Turning Off Transistors In Response To Application Of Local Oscillator Input Signals**

Claim 13 further recites in-part an interconnection circuitry to turn off the second transistor when the first local oscillator input signal is applied to the first transistor and to turn off the first transistor when the second local oscillator input signal is applied to the second transistor.

In the statement of rejection, the Examiner admits that the combination of Irie and Komurasaki does not disclose these features (see, page 3, last ¶ of Office Action), and Dobrovolny is relied upon to cure these deficiencies. Applicant respectfully disagrees.

Dobrovolny describes a high level wide band resistive mixer that includes a high level RF source 10 coupled to a bifilar balun transformer 11 (2:49-50). The transformer 11 is coupled to a trifilar transformer 13 that includes an input winding 15 and a pair of output windings 16/17 (2:56-58). The windings 16/17 have terminals connected to drain electrodes of a pair of MESFET devices 22/26, respectively (2:60-63). The source electrodes of the MESFET devices 22/26 are connected to ground, and the gate electrodes are connected to a symmetric LO source 40 (2:64-68). As shown in Fig. 2, the MESFET 22/26 are represented by switches 22'/26', and are controlled to alternately connect the free terminals of the windings 16/17 to ground.

However, Dobrovolny fails to disclose turning off any of the MESFET 22/26, as required by claim 1. In Dobrovolny, the switches 22'/26' is controlled to alternately connects the terminals of the windings 16/17 to ground by the LO source 40. While the signal from the LO source 40 is applied to the transistor 22, the transistor 36 is also switching on and off. Thus, the transistor 26 remains on while the signal from the LO source 40 is applied to the transistor 22. In contrast, claim 13 requires that, for example, one transistor be turned off while the local oscillator input signal is applied to the other transistor.

**D. Irie, Komurasaki and Dobrovolny Do Not Provide The Requisite Motivation**

Claim 13 further recites in-part a common node for at least one of the first radio frequency input signal and the second radio frequency input signal and an intermediate

Applicant : Brian J. McNamara et al.  
 Serial No. : 10/722,845  
 Filed : November 25, 2003  
 Page : 8 of 13

Attorney's Docket No.: 12754-068002 / I0402USCON

frequency output signal, and interconnection circuitry to turn off the second transistor when the first local oscillator input signal is applied to the first transistor and to turn off the first transistor when the second local oscillator input signal is applied to the second transistor.

In the statement of rejection, the Examiner admits that the combination of Irie and Komurasaki does not disclose these features (see, page 3, last ¶ of Office Action), and Dobrovolny is relied upon to cure these deficiencies. The Examiner also asserts that the proposed modification of Irie and Komurasaki using the teachings of Dobrovolny "would have been obvious ... in order to provide an improved high level resistive mixer (see, page 4, 2<sup>nd</sup> ¶ of Office Action)."

As a preliminary matter, Applicant notes that in the Office action mailed June 15, 2005, the Examiner previously acknowledged that Dobrovolny does not disclose a common node having the recited features (see, page 4, lines 10-13 of Office Action mailed June 15, 2005). Thus, it appears that the Examiner is providing conflicting opinion regarding what Dobrovolny actually teaches.

Assuming that the Examiner has now rescinded his admission of the foregoing defects found in Dobrovolny, Applicant respectfully submits that the proposed modification of Irie and Komurasaki using the teachings of Dobrovolny still does not arrive at the claimed invention.

**i. The proposed combination is improper**

Applicant respectfully reminds the Examiner that there are various types of mixers including dual band mixers, double-balanced mixers, triple-balanced mixers, quadrature IF mixers and image reject mixers, each of which is structurally and functionally distinct. Applicant notes that the mixer circuit disclosed in Irie is a dual band mixer that accepts two RF signals; namely, a 900 MHz RF signal and a 1800 MHz RF signal (see, ¶ 0009). In contrast, the MESFETS 22/26 disclosed in Dobrovolny which act as switches 22'/26' alternately connect the free terminals of the windings 16/17 to ground for switching the polarity of the same symmetrical RF signal at the same frequency to obtain the mixer output signal.

Applicant : Brian J. McNamara et al.  
 Serial No. : 10/722,845  
 Filed : November 25, 2003  
 Page : 9 of 13

Attorney's Docker No.: 12754-068002 / I0402USCON

The Examiner is directed to M.P.E.P § 2143.01 under the heading "THE PROPOSED MODIFICATION CANNOT CHANGE THE PRINCIPLE OF OPERATION OF A REFERENCE" which sets forth the applicable standard:

If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

In the instant case, the Examiner's proposed modification of Irie using Dobrovolny (i.e., replacing the dual RF inputs of Irie with a single symmetric RF input signal) is *inconsistent* with Irie's express objective (i.e., to provide a dual band mixer that accepts two RF signals), and doing so in the manner asserted by the pending rejection would effectively change the principle of operation of the mixer circuit disclosed in Irie, as Dobrovolny is drawn to a different type of mixer (i.e., double-balanced wide band RF mixer).

It is improper for the pending Office Action to simply *pick* and *choose* selected elements from various references to reconstruct the claimed invention. Thus, Applicant respectfully submits that there is no disclosed need or desire for modifying Irie using Dobrovolny as alleged by the pending rejection, thereby underscoring the nonobviousness of the claimed invention as a whole. *In re Fritch*, 972 F.2d 1260, 23 USPQ2d 1780 (Fed. Cir. 1992); *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984); *In re Schulpen*, 390 F.2d 1009, 157 USPQ 52 (CCPA 1968).

**ii. The alleged motivation is not relevant to the mixer circuit of Irie**

Again, Applicant respectfully reminds that the Examiner that a proper §103 rejection requires a motivation or suggestion from the prior art in order to combine the teachings of various references. However, the Examiner has not established a proper motivation, as the alleged motivation ("... in order to provide [an] improved high level resistive mixer") asserted in the pending Office Action is irrelevant and unrelated to the dual band mixer disclosed in Irie.

Specifically, in Dobrovolny, an "improved high level wide band resistive mixer", or a double-balanced wide band RF mixer, can be obtained, for example, by the utilization of a pair

Applicant : Brian J. McNamara et al.  
 Scrial No. : 10/722,845  
 Filed : November 25, 2003  
 Page : 10 of 13

Attorney's Docket No.: 12754-068002 / 10402USCON

of high speed linear GaAs MESFETS supplied with a symmetrical RF input signal and a symmetrical LO switching signal. In contrast, Irie has provided no discussion regarding the use of transistors. In fact, signal mixing in Irie is achieved through the use of two multipliers 3 and 4 (e.g., combiners), and not transistors, to combine the dual input RF signals 1 and 2 with the local oscillator signals LOin output from the local oscillator 8.

As such, Applicant respectfully submits that the PTO has again failed to discharge the initial burden of identifying any basis of record upon which to predicate the conclusion that one having ordinary skill in the art would have been realistically impelled to modify the dual band mixer of Irie to arrive at the claimed invention. *In re Mayne*, 104 F.3d 1339, 41 USPQ2d 1451 (Fed. Cir. 1997).

Indeed, the asserted motivations set forth by the pending Office Action appear to be based on hindsight reasoning using the pending claims to reconstruct the claimed invention, and/or the Examiner's opinion of what would have been obvious. At best, the Examiner has attempted to show only that the elements of the claimed invention are *individually* known without providing a *prima facie* showing of obviousness that the *combination* of elements recited in the claims is known or suggested in the art. As stated in M.P.E.P. § 2143.01 under the subsection entitled "Fact that the Claimed Invention is Within the Capabilities of One of Ordinary Skill in the Art is Not Sufficient by Itself to Establish *Prima Facie* Obviousness", a statement that modifications of the prior art to meet the claimed invention would have been [obvious] because the references relied upon teach that all aspects of the claimed invention were *individually* known in the art is *not* sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. (citing *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993)).

Only Applicant's specification suggests the features of the claimed invention, whereas the Examiner has attempted to modify Irie to reach the claimed invention by alleging all differences are obvious notwithstanding that none of the prior art "suggest the desirability" of the alleged modification.

Applicant : Brian J. McNamara et al.  
 Serial No. : 10/722,845  
 Filed : November 25, 2003  
 Page : 11 of 13

Attorney's Docket No.: 12754-068002 / I0402USCON

Based on all the foregoing, Applicant respectfully requests that the rejection of claim 13 under 35 U.S.C. § 103 over Irie in view of Komurasaki and Dobrovolny be withdrawn.

### Claim 21

Claim 21 recites in-part a dual band mixer including interconnection circuitry configured to turn off transistors other than one transistor at which a local oscillation input signal.

As the Examiner has not identified this feature in any of the cited prior art, it is difficult for Applicant to respond to the rejection by shooting arrows into the dark. *In re Mullin*, 481 F.2d 1333, 179 USPQ 97 (CCPA 1973). Applicant respectfully submits that neither Irie, Komurasaki nor Dobrovolny disclose or suggest this claimed feature.

If the pending rejection is maintained, Applicant respectfully requests that the next Office Action identify this feature in the prior art so as to afford the Applicant an opportunity to address this issue.

### Claim 22

Claim 22 recites in-part mixing a second local oscillator input signal with a second radio frequency input signal at a second transistor, the second radio frequency input signal operating at a different radio frequency band than the first radio frequency input signal, and turning off a second transistor when a first local oscillator input signal is applied to a first transistor and turning off the first transistor when a second local oscillator input signal is applied to the second transistor.

As discussed *supra*, Applicant respectfully submits that a proper motivation for modifying Irie using Komurasaki and Dobrovolny has not been established. Thus, for reasons analogous to those argued respect to claim 13, Applicant respectfully submits that claim 22 is allowable over the combination of Irie, Komurasaki and Dobrovolny.

Applicant : Brian J. McNamara et al.  
 Serial No. : 10/722,845  
 Filed : November 25, 2003  
 Page : 12 of 13

Attorney's Docket No.: 12754-068002 / I0402USCON

**III. All Dependent Claims Are Allowable Because The Independent Claims From Which They Depend Are Allowable**

Under Federal Circuit guidelines, a dependent claim is neither anticipated nor rendered obvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplicatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as independent claims 13, 21 and 22 are patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also in condition for allowance.

**IV. Conclusion**

By responding in the foregoing remarks only to particular positions taken by the Examiner, the Applicant does not acquiesce with other positions that have not been explicitly addressed. In addition, Applicant's arguments for the patentability of a claim should not be understood as implying that no other reasons for the patentability of that claim exist.

For all of the reasons set forth above, it is urged that the application is in condition for allowance, an indication of which is respectfully solicited.

If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicant's attorney at the telephone number shown below.



Applicant : Brian J. McNamara et al.  
Serial No. : 10/722,845  
Filed : November 25, 2003  
Page : 13 of 13

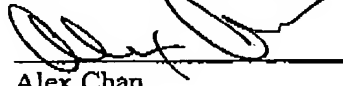
Attorney's Docket No.: 12754-068002 / I0402USCON

A petition for a two-month extension of time under 37 C.F.R. § 1.136 is hereby made.  
Please charge any shortage in fees due in connection with the filing of this paper, including  
extension of time fees, to Deposit Account 06-1050.

Date: \_\_\_\_\_

11/27/06

Respectfully submitted,



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